

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Please amend the claims as follows:

1. (Currently Amended) A method comprising:

receiving in an aggregation device a plurality of keep-alive messages in a communication network;

sending an aggregated request packet which includes data indicating that a status of point to point (PPP) sessions is requested;

receiving an aggregated reply packet from a peer aggregation device, wherein the aggregated reply packet indicates a status of at least some of the plurality of PPP sessions, wherein content of a local status table is updated with the status of the at least some of the plurality of PPP sessions;

maintaining the local status table in said aggregation device, wherein said local status table indicates ~~the~~ a current status of sessions supported by said aggregation device;

updating said local status table with ~~the~~ information in said aggregated reply packet; and

generating a proxy keep-alive reply according to said local status table.

2. (Currently Amended) The method of claim 1, further comprising:

receiving said aggregated request packet in said peer aggregation device;

~~indicating the status of said plurality of sessions in the aggregated reply packet;~~ and

sending said aggregated reply packet to said aggregation device.

3. - 5. (Cancelled)

6. (Currently Amended) The method of claim 1, wherein said a proxy keep-alive message indicates that ~~the a~~ corresponding session is alive/OK when a first keep-alive message is received for the corresponding session.

7. (Cancelled)

8. (Original) The method of claim 1, wherein said communication network is implemented using one of frame relay, ATM and IP networks.

9. (Original) The method of claim 1, wherein said aggregation device is one of a network access server and home gateway.

10. (Currently Amended) A method comprising:
examining an aggregated request packet to determine that a status of a plurality of point-to-point sessions is requested;
determining the status of each of said plurality of point-to-point (PPP) sessions;
generating an aggregated reply packet indicating the status of said plurality of point-to-point sessions; and
sending said aggregated reply packet to a peer aggregation device, wherein the aggregated reply packet indicates a status of at least some of the plurality of PPP sessions, wherein content of a remote status table is updated with the status of the at least some of the plurality of PPP sessions, wherein a local status table is maintained and indicates a current status of sessions supported by the aggregation device, and wherein the local status table is updated with information in the aggregated reply packet, and wherein a proxy keep-alive reply message is generated according to the local status table.

11. (Cancelled)

12. (Original) The method of claim 10, wherein said generating comprises including a client magic number associated with each of said plurality of point-to-point sessions.

13. (Currently Amended) The method of claim 10, wherein said generating comprises setting a bit to one logical value to indicate that a corresponding one of said plurality of sessions is OK/alive, ~~and to another logical value to indicate that said corresponding one of said plurality of session not OK/alive.~~

14. (Original) The method of claim 10, wherein said aggregation device comprises one of a network access server (NAS) and a home gateway implemented in a communication network.

15. (Currently Amended) An aggregation device for processing a plurality of keep-alive messages generated by a corresponding plurality of end systems, comprising:

an input interface receiving said plurality of keep-alive messages;

a message aggregator coupled to said input interface, said message aggregator examining said plurality of messages and generating data according to a format indicating that a status of point to point (PPP) sessions is requested;

an output interface sending an aggregated request packet on a communication network to a peer aggregation device, said aggregated request packet containing said data generated by said message aggregator, wherein the aggregation device is further configured to receive an aggregated reply packet from the peer aggregation device, wherein the aggregated reply packet indicates a status of at least some of the plurality of PPP sessions, wherein content of a local status table is updated with the status of the at least some of the plurality of PPP sessions;

an encapsulator encapsulating said data in a packet suitable for transmission on said communication network; and

a de-aggregator configured to receive the aggregated reply packet from said peer aggregation device, wherein said aggregated reply packet indicates the status of the at least some of said plurality of PPP sessions, said de-aggregator updating said remote status table with the information in said aggregated reply packet.

16. - 17. (Cancelled)

18. (Previously Presented) The aggregation device of Claim 15, further comprising a proxy reply unit sending a proxy keep-alive reply message to one of said plurality of end systems originating a corresponding one of said keep alive-messages without waiting for said aggregated reply packet.

19. (Previously Presented) The aggregation device of claim 18, wherein said aggregation device comprises a network access server.

20. (Cancelled)

21. (Currently Amended) An aggregation device for processing a plurality of keep-alive messages generated by a corresponding plurality of end systems, comprising:

means for receiving said plurality of keep-alive messages;

means for generating an aggregated request packet which includes data indicating that a status of point to point (PPP) sessions is requested;

means for sending said aggregated request packet to a peer aggregation device;

means for receiving an aggregated reply packet from the peer aggregation device, wherein the aggregated reply packet indicates a status of at least some of the plurality of PPP sessions, wherein content of a local status table is updated with the status of the at least some of the plurality of PPP sessions;

means for maintaining the local status table in said aggregation device, wherein said local status table indicates the a current status of sessions supported by said aggregation device;

means for updating said local status table with the information in said aggregated reply packet; and

means for generating a proxy keep-alive reply according to said local status table.

22. - 24. (Cancelled)

25. (Currently Amended) An aggregation device for processing an aggregated request packet, wherein said aggregated request packet is received from a peer aggregation device and indicates that a status of a plurality of point-to-point sessions are requested, said aggregation device comprising:

means for examining said aggregated request packet to determine that the status of said plurality of point-to-point sessions is requested;

means for determining the status of each of said plurality of point-to-point sessions;

means for generating an aggregated reply packet indicating the status of said plurality of point-to-point sessions;

means for sending said aggregated reply packet to said peer aggregation device, wherein the aggregated reply packet indicates a status of at least some of the plurality of PPP sessions, wherein content of a remote status table is updated with the status of the at least some of the plurality of PPP sessions, wherein a local status table is maintained and indicates a current status of sessions supported by the aggregation device, and wherein the local status table is updated with information in the aggregated reply packet, and wherein a proxy keep-alive reply message is generated according to the local status table.

26. (Cancelled)

27. (Original) The aggregation device of claim 25, wherein said means for generating includes a client magic number associated with each of said plurality of point-to-point sessions.

28. (Currently Amended) The aggregation device of claim 25, wherein said means for generating sets a bit in said aggregated reply packet to one logical value to indicate that a corresponding one of said plurality of sessions is OK/alive, ~~and to another logical value to indicate that said corresponding one of said plurality of sessions is not OK/alive.~~

29. (Original) The aggregation device of claim 25, wherein said aggregation device comprises one of a network access server (NAS) and a home gateway implemented in a communication network.

30. (Currently Amended) An aggregation device for processing an aggregated request packet, wherein said aggregated request packet is received from a peer aggregation device and indicates that a status of a plurality of point-to-point sessions are requested, said aggregation device comprising:

an input interface configured for receiving said aggregated request packet;

a de-encapsulator configured for examining said aggregated request packet to determine that the status of said plurality of point-to-point (PPP) sessions is requested;

a reply generator configured for determining the status of each of said plurality of point-to-point sessions, and generating an aggregated reply packet indicating the status of each of said plurality of point-to-point sessions; and

an output interface configured for sending said aggregated reply packet to said peer aggregation device, wherein content of a local status table is updated with the status of the PPP sessions, wherein the local status table indicates a current status of particular sessions supported by the aggregation device, and wherein the local status table is updated with information in the aggregated reply packet, and wherein a proxy keep-alive reply message is generated according to the local status table.

31. (Cancelled)

32. (Currently Amended) The aggregation device of claim 30, further comprising a session manager configured for updating ~~the status of said plurality of point-to-point sessions in~~ said local status table.

33. (Original) The aggregation device of claim 30, wherein said reply generator includes in said aggregated reply packet a client magic number associated with each of said plurality of point-to-point sessions.

34. (Currently Amended) The aggregation device of claim 30, wherein said reply generator sets a bit in said aggregated reply packet to one logical value to indicate that a corresponding one of said plurality of sessions is OK/alive, ~~and to another logical value to indicate that said corresponding one of said plurality of sessions is not OK/alive.~~

35. (Original) The aggregation device of claim 30, further comprising a keep-alive processor coupled to said de-encapsulator, wherein said keep-alive processor examines said aggregated request packet to determine that status of point-to-point sessions is requested and causes said reply generator to generate said aggregated reply packet.

36. (Original) The aggregation device of claim 30, wherein said aggregation device comprises one of a network access server (NAS) and a home gateway implemented in a communication network.

37. (Currently Amended) A non-transitory medium including one or more sequences of instructions, wherein execution of said one or more sequences of instructions by one or more processors causes the actions of:

receiving in an aggregation device a plurality of keep-alive messages;

generating in said aggregation device an aggregated request packet which includes data indicating that ~~the a~~ status of PPP sessions is requested;

receiving an aggregated reply packet from a peer aggregation device, wherein the aggregated reply packet indicates a status of at least some of the plurality of PPP sessions, wherein content of a local status table is updated with the status of the at least some of the plurality of PPP sessions;

updating said remote status table with ~~the~~ information in said aggregated reply packet; and

generating a proxy keep-alive reply according to said remote status table.

38. - 41. (Cancelled)

42. (Currently Amended) A non-transitory medium including one or more sequences of instructions, wherein execution of said one or more sequences of instructions by one or more processors causes the actions of:

examining said aggregated request packet to determine that a status of a plurality of point-to-point sessions is requested;

determining the status of each of said plurality of point-to-point sessions;

generating an aggregated reply packet indicating the status of said plurality of point-to-point sessions;

sending said aggregated reply packet to a peer aggregation device; and

receiving the aggregated reply packet from the peer aggregation device, wherein the aggregated reply packet indicates a status of at least some of the plurality of PPP sessions, wherein content of a local status table is updated with the status of the at least some of the plurality of PPP sessions, wherein the local status table indicates a current status of sessions supported by the aggregation device, and wherein the local status table is updated with information in the aggregated reply packet, and wherein a proxy keep-alive reply message is generated according to the local status table.

43. (Cancelled)

44. (Previously Presented) The medium of claim 42, wherein said generating comprises including a client magic number associated with each of said plurality of point-to-point sessions.

45. (Currently Amended) The medium of claim 42, wherein said generating comprises setting a bit to one logical value to indicate that a corresponding one of said plurality of sessions is OK/alive, ~~and to another logical value to indicate that said corresponding one of said plurality of sessions is not OK/alive.~~

46. (Previously Presented) The medium of claim 42, wherein said aggregation device comprises one of a network access server (NAS) and a home gateway implemented in a communication network.

47. (Currently Amended) A system, comprising:

a first aggregation device receiving a plurality of keep-alive messages generated by a corresponding plurality of end systems, each of said plurality of keep-alive messages being designed to request a status of a corresponding point to point (PPP) session implemented on a communication network, said first aggregation device generating an aggregated request packet which includes data indicating that the status of said PPP sessions is requested, and sending said aggregated request packet; and

a peer aggregation device receiving said aggregated request packet and indicating the status of said plurality of sessions in an aggregated reply packet, said peer aggregation packet sending said aggregated reply packet to said first aggregation device, wherein content of a local status table is updated with the status of the PPP sessions, wherein the local status table indicates a current status of sessions supported by the first aggregation device, and wherein the local status table is updated with information in the aggregated reply packet, and wherein a proxy keep-alive reply message is generated according to the local status table.

48. (Previously Presented) The system of claim 47, wherein said first aggregation device is located at an edge of the communication network.

49. (Previously Presented) The system of claim 48, further comprising an access network coupling said first aggregation device to said corresponding plurality of end systems, wherein said plurality of keep-alive messages are received on said access network.

50. (Previously Presented) The system of claim 49, wherein said first aggregation device and said peer aggregation device respectively comprise a network access server (NAS): and a home gateway.

51. - 58. (Cancelled)

59. (Previously Presented) The method of claim 1, wherein said aggregation device is physically separate from said plurality of end systems.

60. (Previously Presented) The method of claim 10, wherein said aggregation device is physically separate from said plurality of end systems.

61. - 66. (Cancelled)

67. (Currently Amended) The method of claim 1, wherein said generating includes less data in said aggregated request packet than ~~the~~ data forming said plurality of keep-alive messages together.

68. (Currently Amended) The method of claim 67, wherein each of said plurality of keep-alive messages contains an identifier of a corresponding PPP session, wherein said generating comprises:

selecting said identifier of each of said plurality of keep-alive messages; and
forming said aggregated request packet ~~from said identifiers, wherein whereby~~ said aggregated request packet contains less data than said plurality of keep-alive messages together.

69. (Previously Presented) The method of claim 1, wherein each of said PPP sessions terminates at a home gateway, and wherein said aggregation device comprises a switching device and is in the path of each of said PPP sessions from a corresponding one of said plurality of end systems to said home gateway.

70. (Currently Amended) The aggregation device of claim 30, wherein said reply generator includes less data in said aggregated request packet than ~~the~~ data forming said plurality of keep-alive messages together.

71. (Currently Amended) The aggregation device of claim 70, wherein each of said plurality of keep-alive messages contains an identifier of a corresponding PPP session, wherein said reply generator operates to:

select said identifier of each of said plurality of keep-alive messages; and
form said aggregated request packet ~~from said identifiers, wherein whereby~~ said aggregated request packet contains less data than said plurality of keep-alive messages together.

72. (Previously Presented) The aggregation device of claim 30, wherein each of said PPP sessions terminates at a home gateway, and wherein said aggregation device comprises a switching device and is in the path of each of said PPP sessions from a corresponding one of said plurality of end systems to said home gateway.

73. (Currently Amended) The medium of claim 37, wherein said generating includes less data in said aggregated request packet than ~~the~~ data forming said plurality of keep-alive messages together.

74. (Currently Amended) The medium of claim 73, wherein each of said plurality of keep-alive messages contains an identifier of a corresponding PPP session, wherein said generating comprises:

selecting said identifier of each of said plurality of keep-alive messages; and

forming said aggregated request packet ~~from said identifiers, whereby~~ wherein said aggregated request packet contains less data than said plurality of keep-alive messages together.

75. (Previously Presented) The medium of claim 37, wherein each of said PPP sessions terminates at a home gateway, and wherein said aggregation device comprises a switching device and is in the path of each of said PPP sessions from a corresponding one of said plurality of end systems to said home gateway.

76. (Currently Amended) The aggregation device of claim 21, wherein said means for generating includes less data in said aggregated request packet than ~~the~~ data forming said plurality of keep-alive messages together.

77. (Currently Amended) The aggregation device of claim 76 wherein each of said plurality of keep-alive messages contains an identifier of a corresponding PPP session, wherein said means for generating operates to:

select said identifier of each of said plurality of keep-alive messages; and

form said aggregated request packet ~~from said identifiers, whereby~~ wherein said aggregated request packet contains less data than said plurality of keep-alive messages together.

78. (Previously Presented) The aggregation device of claim 21, wherein each of said PPP sessions terminates at a home gateway, and wherein said aggregation device comprises a switching device and is in the path of each of said PPP sessions from a corresponding one of said plurality of end systems to said home gateway.

79. (Previously Presented) The method of claim 1, wherein said receiving, said generating and said sending are performed in an aggregation device implemented as a single device.

80. (Previously Presented) The method of claim 10, wherein said examining, said determining, said generating and said sending are performed in said aggregation device implemented as a single device.

81. (Previously Presented) The aggregation device of claim 21, wherein said means for receiving, said means for generating and said means for sending are contained in said aggregation device implemented as a single device.

82. (Previously Presented) The aggregation device of claim 25, wherein said means for examining, said means for determining, said means for generating and said means for sending are implemented in said aggregation device implemented as a single device.

83. (Previously Presented) The aggregation device of claim 30, wherein said input interface, said de-encapsulator, said reply generator and said output interface are contained in said aggregation device implemented as a single device.

84. (Previously Presented) The medium of claim 37, wherein said receiving, said generating and said sending are performed by said aggregation device implemented as a single device.

85. (Previously Presented) The medium of claim 42, wherein said examining, said determining, said generating and said sending are performed by said aggregation device implemented as a single device.